Westside

Summer Packet
Geometry PREP

IMPORTANT INSTRUCTIONS FOR STUDENTS!!!

- Students should try to answer all the questions; you <u>must</u> show all work.
- Khan Academy video tutorials may be very helpful to you. Links to video tutorials are included for each section.
- For help with fractions go to: http://www.khanacademy.org/math/arithmetic/fractions
- There will be an <u>assessment</u> over this material on or before <u>Friday, September 6, 2019.</u>
- Finally, honor and integrity is at the heart of a Westside Wolf! Smart wolves never cheat. You are only hurting yourself by attempting to copy someone else's work. This packet is to help you be ready for Geometry and help your teachers know what you can do.
- All existing and new students who are enrolled at WHS on or before August 23rd, must submit their summer packet to their math teacher no later than <u>Tuesday, September 3, 2019.</u>
- Students who enrolled at Westside High School on or after August 26th, must submit their summer packet <u>within two weeks of their enrollment date at Westside.</u>

Now! Get Ready, Get Set, and Do Your Best!

Directions: Show all your work and box all your answers.

A. Reduce each fraction to lowest terms.

1. $\dfrac{14}{28}$
2. $\dfrac{27}{18}$
3. $\dfrac{8}{32}$
4. $\dfrac{120}{200}$
5. $\dfrac{56}{20}$

B. Find the equivalent fraction.

1. $\dfrac{2}{3} = \dfrac{}{9}$
2. $\dfrac{9}{8} = \dfrac{}{24}$
3. $\dfrac{5}{6} = \dfrac{}{12}$
4. $\dfrac{5}{3} = \dfrac{}{15}$
5. $\dfrac{7}{4} = \dfrac{}{32}$

C. Add or Subtract. Make sure your final answer is reduced to lowest terms.

1. $\dfrac{2}{7} + \dfrac{3}{7}$
2. $-\dfrac{1}{2} + \dfrac{3}{7}$
3. $\dfrac{1}{8} - \dfrac{3}{4}$
4. $\dfrac{4}{9} - \dfrac{1}{6}$
5. $1\dfrac{3}{4} + 2\dfrac{3}{8}$

D. Simplify

1. $4 + (-11)$
2. $-7 + 3$
3. $-12 + (-18)$
4. $9 - 17$

5. $12 - (-11)$
6. $(-21) - (-32)$
7. $4(-9)$
8. $(-7)(-6)$

9. $63 \div (-9)$
10. $-48 \div (-4)$
11. $\dfrac{-72}{8}$
12. $\dfrac{48}{-8}$

E. Find the slope of the line containing each pair of points.
For help with slope go to:
https://www.khanacademy.org/math/algebra/two-var-linear-equations/slope/v/slope-of-a-line-2

> **Slope formula** $m = \dfrac{y_2 - y_1}{x_2 - x_1}$ *Ex:* $(1, -3)$ and $(4, 5)$ $m = \dfrac{5 - (-3)}{4 - 1} = \dfrac{8}{3}$

1. $(5, 0)$ and $(6, 8)$
2. $(4, -3)$ and $(6, -4)$
3. $(-2, -4)$ and $(-9, -7)$

F. Find the slope of each line.

> **Slope intercept formula**: $y = \underset{\text{slope}}{m} x + \underset{\text{y-intercept}}{b}$
>
> Example: $3x + 4y = 12$
> $-3x \qquad -3x$
> $4y = -3x + 12$
> $\dfrac{4}{4} \quad \dfrac{}{4} \quad \dfrac{}{4}$
> $y = -\dfrac{3}{4}x + 3$
>
> Slope is $-\dfrac{3}{4}$
> y-intercept is $(0, 3)$
>
> **Special Cases:**
> Horizontal lines are $y = a\ number$, slope is "0"
> Vertical line $x = a\ number$, slope is "no slope"
> OR
> HOY and VUX
> **H** horizontal line   **V** vertical line
> **O** zero slope   **U** undefined slope
> **Y** y = #   **X** x = #

1. $y = 7$
2. $x = -4$
3. $2x + y = 15$
4. $x - 2y = 7$

**G. Find the equation of the line with the given slope through the given point.
Write the answer in _slope-intercept_ form.**

For help with linear equations go to: https://www.khanacademy.org/math/algebra-home/alg-linear-eq-func/alg-writing-slope-intercept-equations/v/equation-of-a-line-2

Slope intercept formula: $y = \underset{\text{slope}}{m}\ x + \underset{\text{y-intercept}}{b}$

Example: $m = -5$; $(-2,1)$ Plug the slope and point into the slope-intercept formula to find the y-intercept.

$$1 = -5(-2) + b$$
$$1 = 10 + b$$
$$-9 = b \qquad \boxed{y = -5x - 9}$$

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1. $m = 4$; $(3,2)$

2. $m = -2$; $(4,7)$

3. $m = -\dfrac{4}{3}$; $(3,-1)$

**H. Find the equation of the line containing the following points.
Use point-slope form to write answer in _slope-intercept form_.**

For help with linear equations go to: https://www.khanacademy.org/math/algebra/two-var-linear-equations/point-slope/v/point-slope-and-slope-intercept-form-from-two-points

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Use examples from Part E to find slope.

Example: $(3,-2)$ and $(6,0)$

$$m = \frac{0-(-2)}{6-3} = \frac{2}{3}$$

Take the slope and one of the points and plug into point slope. Solve and write equation in slope-intercept form.

Point slope formula: $\underset{\substack{\text{y of}\\\text{ordered}\\\text{pair}}}{y - y_1} = \underset{\text{slope}}{m}\ (\underset{\substack{\text{x of}\\\text{ordered}\\\text{pair}}}{x - x_1})$ Use point slope when you have a point and slope and want an equation of a line in slope intercept. Solve the equation for y once the point and slope are plugged in.

Example: $y - (-2) = \dfrac{2}{3}(x - 3)$ Plug in ordered pair and slope

$\qquad\quad y + 2 = \dfrac{2}{3}x - 2$ Distribute

$\qquad\quad \underline{\ -2 \qquad -2\ }$

$\qquad\quad y = \dfrac{2}{3}x - 4$ Solve for "y", now equation is in slope intercept form

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1. $(2,6)$ and $(4,1)$

2. $(3,5)$ and $(-5,3)$

3. $(-2,-3)$ and $(-4,-6)$

4. The line containing $(-3,-2)$ and $(5,2)$.

5. The line containing $(3,3)$ and $(-6,9)$.

6. The line with slope $\dfrac{4}{5}$ and containing $(-1,7)$.

7. The horizontal line passing through $(2,5)$.

8. The vertical line passing through $(-4,3)$.

I. Point-Slope Form
For help with graphing: http://www.khanacademy.org/math/algebra/linear-equations-and-inequalitie/graphing_solutions2/v/graphs-of-linear-equations
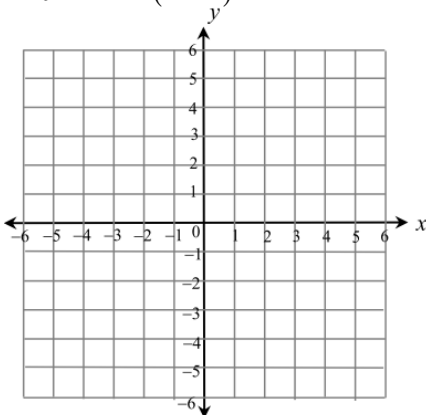
Graph from point slope,

$y+3=2(x+1)$ Equation
$(-1,-3)$ $m=2$ Pull out point and slope from equation.
                 Plot point
                 Use slope to plot other points
                 Draw line
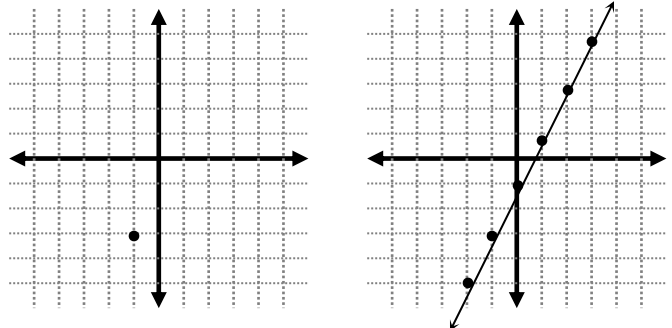
Slope is $\dfrac{rise}{run} = \dfrac{+\,=\,up\;\;or\;\;-\,=\,down}{+\,=\,right\;\;or\;\;-\,=\,left} = \dfrac{2}{1} = 2\,up\;and\;1\;right$

Graph the following equations. Graph three points and label the line with its equation.

1. $y-3=2(x-1)$
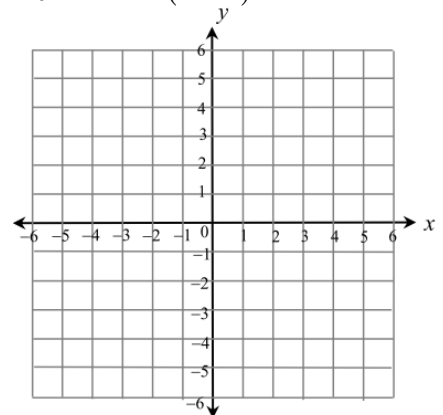
2. $y-5=\dfrac{2}{3}(x-2)$
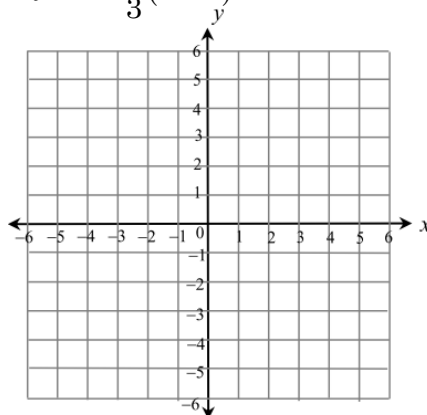
3. $y-4=-3(x-5)$

J. Slope-Intercept Form

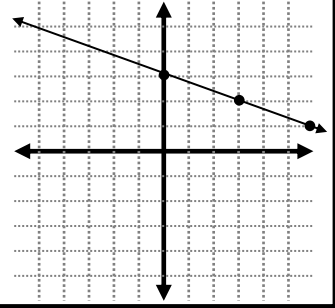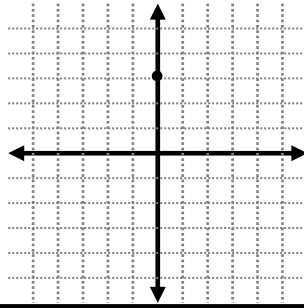**Graphing from slope intercept,** $y = \underset{\text{slope}}{m}\ x + \underset{\text{y-intercept}}{b}$
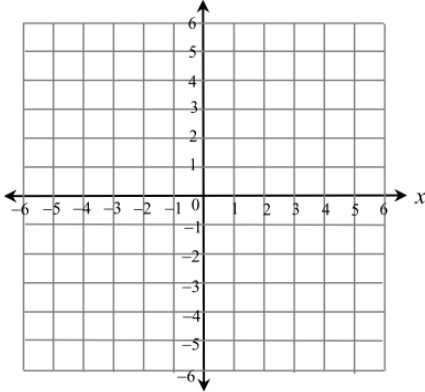
$y = -\dfrac{1}{3}x + 3$ Equation

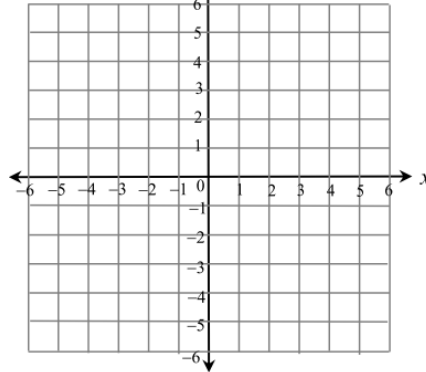$m = -\dfrac{1}{3}$ $(0,3)$ Pull out slope and y-intercept
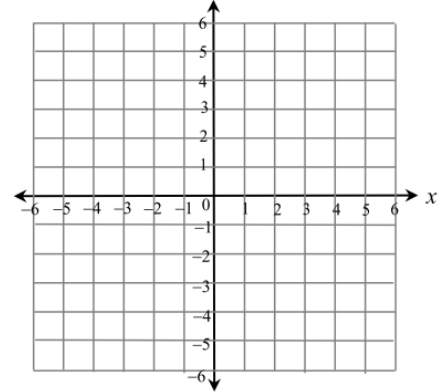
Graph y-intercept
Use slope to graph other points

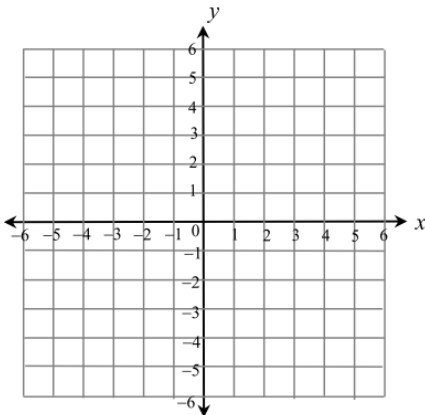1. $y = 2x - 3$

2. $y = \dfrac{1}{2}x - 5$
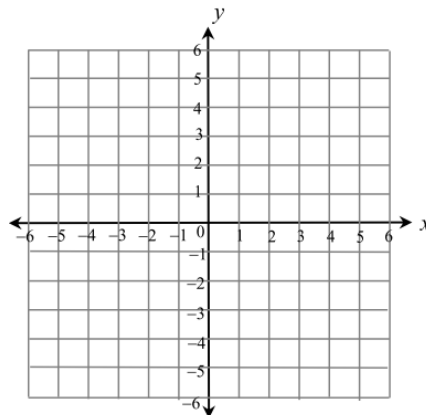
3. $y = -2x + 3$

K. Standard Form

Graphing from standard form, $Ax + By = C$

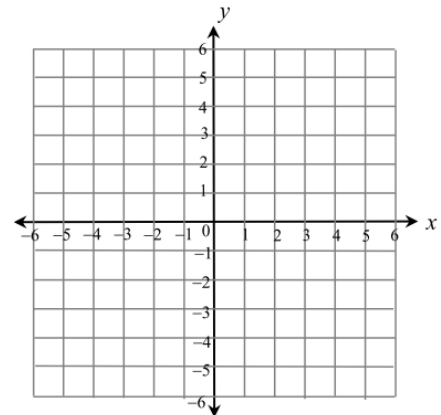Take equation and solve for **slope intercept form** ($y = mx + b$), then use the steps from Part I.

1. $4x + 2y = 8$

2. $x - 3y = 6$

3. $4x + 6y = 12$

L. Simplify each expression using appropriate Order of Operations.

For help with order of operations go to: http://www.khanacademy.org/math/arithmetic/multiplication-division/order_of_operations/v/introduction-to-order-of-operations

PEMDAS = **P**arentheses, **E**xponents, **M**ultiplication/**D**ivision, **A**dd/**S**ubtract

1. $1 \cdot 5 - 6 \div 2 + 3^2$

2. $125 \div \left[5(2+3) \right]$

3. $4 + 2(10 - 4 \cdot 6)$

4. $3(2+7)^2 \div 5$

5. $12(20 - 17) - 3 \cdot 6$

6. $3^2 \div 3 + 2^2 \cdot 7 - 20 \div 5$

M. Multiply the following binomials.

For help with multiplying binomials go to:
https://www.khanacademy.org/math/algebra/introduction-to-polynomial-expressions/multiplying-binomials-2/v/multiplying-binomials

BOX Method

$$6x^2+10x-12x-20=\underbrace{6x^2-2x-20}_{combine\ like\ terms}$$

	$2x$	-4
$3x$	$6x^2$	$-12x$
$+5$	$10x$	-20

1. $(x+3)(x+4)$

2. $(2x+1)(x+4)$

3. $(6x+5)(2x-1)$

4. $(x-4)(x+4)$

5. $(x-6)^2$

6. $(6x+5y)^2$

N. Use Pythagorean Theorem to find the missing side of the right triangles.   Round to the nearest hundredth if necessary.

For help with Pythagorean Theorem go to:
http://www.khanacademy.org/math/geometry/right_triangles_topic/pyth_theor/v/the-pythagorean-theorem

Pythagorean Theorem $A^2+B^2=C^2$, A and B are the legs and C is the hypotenuse (longest side).

$a=3, b=6, c=?$		$a=4, b=?, c=12$	
$a^2+b^2=c^2$	Pythagorean Theorem	$a^2+b^2=c^2$	Pythagorean Theorem
$3^2+6^2=c^2$	Plug in values	$4^2+b^2=12^2$	Plug in values
$9+36=c^2$	Square Numbers	$16+b^2=144$	Square Numbers
$45=c^2$	combine numbers	$b^2=120$	Get all numbers on one side
$\sqrt{45}=\sqrt{c^2}$	square root both sides	$\sqrt{b^2}=\sqrt{120}$	square root both sides
$6.71=c$	answer	$b=10.95$	answer

1. $a=5,\ b=12,\ c=?$

2. $a=6,\ b=3,\ c=?$

3. $a=5,\ b=8,\ c=?$

4. $a=?,\ b=10,\ c=11$

5. $a=\sqrt{5},\ b=?,\ c=\sqrt{30}$

6. $a=?,\ b=6,\ c=14$

O. Simplify each problem using exponent rules

For help with exponents go to: https://www.khanacademy.org/math/algebra/rational-exponents-and-radicals/alg1-exp-prop-review/v/multiplying-and-dividing-powers-with-integer-exponents

Examples: $x^2 \cdot x^5 = x^{2+5} = x^7$ $\qquad$ $c^6 \cdot c^3 = c^{6+3} = c^9$ $\qquad$ $a \cdot a^5 = a^{1+5} = a^6$

Examples: $(2x^3)(4x^4) = (2 \cdot 4)(x^{3+4}) = 8x^7$

Examples: $(x^2)^4 = (x^{2 \cdot 4}) = x^8$

$\qquad$ $(u^3)^5 = (u^{3 \cdot 5}) = u^{15}$

Examples: $(2x)^4 = (2)^4 \cdot (x)^4 = 16x^4$

$\qquad$ $(-6k)^3 = (-6)^3 \cdot (k)^3 = -216k^3$

1. $x^3 \cdot x^6 =$ _____

2. $c \cdot c^5 \cdot c^2 =$ _____

3. $x^5 \cdot x^6 \cdot x^7 =$ _____

4. $(2a^4)(5a^3) =$ _____

5. $(-2xy^2)(-3x^2y) =$ _____

6. $(3cd^4)(-2c^2)(4cd^2) =$ _____

7. $(a^2)^3 =$ _____

8. $(x^4)^3 =$ _____

9. $(u^3)^6 =$ _____

10. $(5a)^2 =$ _____

11. $(-6x)^2 =$ _____

12. $(-3t)^3 =$ _____

P. Solve for the variable in each problem.

For help with the solving go to: https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-solving-equations/equations-with-parentheses/v/solving-equations-with-the-distributive-property

The five steps to solving an equation are:

- ✓ Get rid of parentheses
- ✓ Simplify the left side and the right side of the equation as much as possible, i.e. combine any and all like terms
- ✓ Get the variable term on just one side
- ✓ Get the variable term by itself
- ✓ Solve for the variable.

Remember, you always use the opposite operation to "get rid" of something.

1. $5(3x-2) = 35$

2. $2(6x+24)-20 = -4(12x-72)$

3. $5r-2(2r+8) = 16$

4. $13-(2c+2) = 2(c+2)+3c$

5. $4(8y+4)-17 = -2(4y-8)+13$
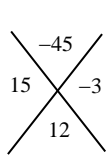
6. $12-3(x-5) = 21$

7. $-8 = -(x+4)$

8. $-(7-4x) = 9$

9. $2(4x-3)-8 = 4+2x$

Q. Solve each quadratic equation using factoring.

For help with solving quadratics using factoring:
https://www.khanacademy.org/math/algebra/quadratics/solving-quadratic-equations-by-factoring/v/example-1-solving-a-quadratic-equation-by-factoring

Example:

$$a^2 + 12a - 45 = (a+15)(a-3) \quad \text{First factor the problem}$$

$$a+15 = 0 \;\; and \;\; a-3 = 0 \quad \text{Make each factor equal to zero and solve for "x"}$$

$$\begin{array}{cc} -15 \;\; -15 & +3 \;\; +3 \\ a = -15 & a = 3 \end{array} \quad \text{Answer}$$

(factor diagram: -45, 15, -3, 12)

1. $x^2 + 7x + 6 = 0$

2. $r^2 - 8r - 9 = 0$

3. $p^2 - 16p + 48 = 0$

4. $x^2 - 8x = -15$

5. $x^2 + 10x + 25 = 0$

6. $x^2 - x - 20 = 0$

R. Simplify the following radicals using perfect squares.

For help with simplifying radicals: https://www.youtube.com/watch?v=Ag6J1iHr9Uk

Example:
1. Find the factors of the number underneath the radical.
2. Find the pair that has the largest perfect square.
3. Take the square of the perfect square and place it on the outside of the radical.
4. Leave the non-perfect number underneath the radical.

$$\sqrt{12} = \sqrt{3 \cdot 4} = 2\sqrt{3}$$

Factors of 12 :
1 • 12
2 • 6
3 • 4

1. $\sqrt{18}$

2. $\sqrt{24}$

3. $\sqrt{27}$

4. $\sqrt{32}$

5. $\sqrt{40}$

6. $\sqrt{45}$

7. $\sqrt{48}$

8. $\sqrt{75}$